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AMSAT NEWS SERVICE
ANS-080

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor(a)amsat.org

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see: https://mailman.amsat.org/postorius/lists/ans.amsat.org/

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space enthusiasts, published by the Radio Amateur Satellite Corporation (AMSAT). Each issue is your source for hardware and software projects, technical tips, STEM initiatives, operational activities, and news from around the world.

Inside the Current Issue:

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AMSAT members can access the Journal at https://launch.amsat.org/The_AMSAT_Journal. Not a member? Join today at https://launch.amsat.org/

[ANS thanks AMSAT for the above information]

Apogee View - January/February 2021

These past two months have certainly been an emotional rollercoaster, with the launch and then silence from RadFxSat-2 (Fox-1E). Getting a front row seat at Virgin Orbit's virtual launch event was a thrilling event for me. I only wish they would have allowed us to share that opportunity with all of you. The excitement of another AMSAT satellite in space, however, faded quickly, with each passing orbit and no beacon reception report. As disheartening as this was, I was never more proud of our Engineering and Operations teams, working together in an attempt to command RadFxSat-2.

While all this was going on, Brad Schumacher, W5SAT, reported hearing his own CW signal through RadFxSat-2's transponder, on January 27th. Our Engineering and Operations team were able to duplicate Brad's efforts and confirm that RadFxSat-2's transponder was partially functioning, although at an extremely reduced power. Having satisfied the requirements for OSCAR designation, RadFxSat-2 (Fox-1E) was designated AMSAT-OSCAR 109 (AO-109).

Our attempts to determine what is keeping AO-109 from functioning properly continues to this day. Receiving the beacon is still our top priority, as one frame of telemetry will give us a much needed look on the health of each subsystem. We know the signal is going to be weak and will require a big antenna system to hear it. Any assistance you can provide would be greatly appreciated; however, we continue to ask that amateur satellite operators not attempt to use the transponder until further notice, as this may draw available power away from the beacon.

I want to personally thank all of our volunteers on the engineering and operations team for all of their hard work, our friends at Vanderbilt University's Institute for Space and Defense Electronics for sharing this dream with us, and each of you for your patience and understanding as we seek to overcome this challenge.

Will There Be a Fox-2?

AO-109 (RadFxSat-2/Fox-1E) marks the last of the planned Fox-1 series of CubeSats. At the same time, while SO-50 continues to operate in LEO, AMSAT finds itself without a continuously operational FM-mode satellite in space. Since AO-51, the so-called "EasySats," have been the most popular amateur satellites. AO-85, AO-91, and AO-92 have proven that offering an easy-to-use and easily accessible satellite, requiring only a handheld

transceiver and a small, handheld directional beam, is essential both for those just getting started on amateur satellites and seasoned operators. In addition, these EasySats play a critical role in introducing amateur satellite communication and extending our educational outreach.

It is imperative that we find a way to provide a sustained presence of FM crossband repeaters in low Earth orbit, without taking away from our current plans to return to high Earth orbits, and I will be making such a proposal to our Board of Directors in the coming months.

If the challenges and shortened lives of AMSAT's Fox-1 series of satellites has taught us anything, it is that trying to shoehorn all of the required subsystems and experiments into a spacecraft no bigger than a softball is no easy feat. We must simplify our designs yet add robustness and redundancy. By chance, AO-7 rose from the dead when its batteries shorted. We need this capability designed into our electrical power system, so, when the batteries fail, the radios are still powered by the solar panels when the satellite is not in eclipse. In addition, we need to ensure no single point of failure jeopardizes our mission. Including redundancy and failsafes in our design will provide added assurance.

Another challenge for us is that AMSAT does not have another FM crossband repeater in its inventory to use for a future satellite, because the necessary components have been discontinued. AMSAT is working on procuring a new, open design for not only our needs but to share with the rest of the world. More information on our plans to accomplish this will follow in a few months.

Running more than one satellite project at the same time will be challenging. With limited volunteer and financial resources, we must make smart decisions. GOLF-TEE and GOLF-1 are still our primary projects, as we continue our march upward to HEO, so we must find ways to recruit additional volunteer engineers, use commercial, off-the-shelf components, outsource construction, and/or a combination thereof.

We have a great opportunity before us, but it is only possible with your support. Your continued membership in AMSAT, purchases in the AMSAT Store, and generous donations, combined with the cost-cutting measures I have recently enacted will help us get there. Please join us in our journey Onward and Upward.

[ANS thanks Robert Bankston, KE4AL, AMSAT President, for the above information]

AMSAT Vice President - Engineering Jerry Buxton, N0JY, Presents at JAMSAT Symposium

AMSAT Vice President Jerry Buxton, N0JY, gave a presentation detailing some of the challenges and work being done to return to HEO at the 2021 JAMSAT Symposium on March 20th.

A replay of the presentation can be viewed at https://youtu.be/b8K3k1RnJMQ?t=3440

[ANS thanks Jerry Buxton, N0JY, AMSAT Vice President - Engineering for the above information]

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Keeping Amateur Radio in Space.
https://amsat.org/product-category/hardware/

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special net, you can stream it from my website http://www.amsatnet.com
 click on Our Audio and select Net #1400. You can also listen as a podcast
at the iTunes store by searching for KK5DO or AMSAT. Andy has been under
the weather and not able to join us for this net.

We have had fun over the years and we have done many different things. I
did a little history from the beginning until today. If you have a chance
take a listen.

[ANS thanks Bruce Paige, KK5DO, AMSAT Director, for the above information]

Soyuz Launch Carrying Several Amateur Radio Payloads Delayed

A Soyuz rocket carrying several amateur payloads was scrubbed from its
planned launch at 06:07 UTC on March 20, 2021. The launch is now planned
for 06:07 UTC on March 22, 2021. This launch carries several amateur radio
payloads. Details below are compiled from AMSAT-BB posts over the past
several days.

DIY-1:

On 03/22/2021 between 11:55 and 11:58 UTC, three radio amateur pocketqubes
will be deployed from the mothership UNISAT-7: DIY-1, SMOG-1 and STECCO.

DIY-1 / ARDUIQUBE (ARGENTINA):

Frequency: 437.125 MHz USB/CW
Power: 25/50/100 mW.
Telemetry: RTTY 100BD 7N2, 15 ppm CW.
ROBOT CW autotransponder, (like RS-5 / RS-7 / RS10-11 soviet satellites)
Antenna: dipole

At the time of deployment DIY will be in low power until verifying the
status of the battery and will be sending only telemetry in an RTTY
sentence. It is recommended to receive it with the FLDIGI-HAB program. Once
the operation and battery charge are verified, the ROBOT will be activated
and we hope it will be the delight of the CW enthusiasts. Much more info
once in orbit. I appreciate the reception reports.

(Gustavo Carpignano, LW2DTZ)

BCCSAT-1:

Editor's Note: BCCSAT-1 has not been coordinated by the IARU.

BCCSAT-1 is an educational multi-spectral Cubesat 1U developed by the
cooperation between Bangkok Christian College and the King’s Mongkut
university of technology north Bangkok. http://bccsat.bcc.ac.th/

Schedule When our cubesat is completely finished it will be launched into
space in March 22,2021 06.07 AM UTC at Russia with the Soyuz-2.1 rocket by
UNISAT-7 GAUSS SRL to the low earth orbit at 575 km.
http://en.roscosmos.ru/21973/ and https://www.roscosmos.ru/30285/

Downlink Frequency
Beacon 435.635 MHz CW https://www.youtube.com/watch?v=hPpSTEf3PUI
Slow Scan Digital Video SSDV Data 435.635 MHz AFSK 1.2 kbps
Telemetry Data 435.635 MHz GMSK 9.6 kbps

After launch into space if AMSAT member receives the CW signal of BCCSAT-1
satellite. please send information to our team directly an email to:
bccsat1(a)gmail.com

BCCSAT-1 is a technology demonstration satellite in Thailand. High school students in Bangkok Cristian College in collaboration with King Mongkut's University of Technology (KMUTNB) and the Radio Amateur Society of Thailand (RAST) https://www.youtube.com/watch?v=zEcg5q7ZBw0 are building the satellite.

The project aims to build capacity on systems engineering, space education, and radio communication technology to students. During the project, students will learn about communication technology through amateur radio activities. It also encourages other interested people to receive the satellite signal.

The main missions of BCCSAT-1 include: (1) testing in-house developed satellite transceiver and antenna in orbit (2) experiment of Slow-Scan Digital Video (SSDV) transmission from the satellite (3) take pictures of Earth by cameras onboard satellite

BCCSAT-1 communication subsystem is an in-house developed transceiver and antennas. It has the capability to transmit GMSK modulation signal at 9.6 kbps, FSK for SSDV at 1.2 kbps and receive AFSK signal at 1.2 kbps. The transceiver will send its parameter such as RSSI and temperature to the ground station.

BCCSAT-1 will carry four cameras onboard the satellite and aim to capture images of the Earth in different wavelengths: red, green, blue, NIR, and Red Edge band.

We hope to process the images acquired for the Normalized Difference Vegetation Index (NDVI) and widely used in Science education. The images will be widely distributed among amateur radio community via the experiment of SSDV transmission system and GMSK packets downlink. Moreover, BCCSAT-1 will be able to transmit pre-stored images chosen by high school students.

BCCSAT-1 will provide the multi spectral images by having the total of 5 cameras on board; Red, Green, Blue, NIR, and Red Edge bands. The images we get from these cameras will be used to process for the Normalized difference vegetation index (NDVI), that will significantly provides huge advantage on analyzing the terrain of the country.

(Tanan Rangseeprom, HS1JAN)

STECCO:

In July 2020 AMSAT Italy and the School of Aerospace Engineering (SIA) of the University "La Sapienza" in Rome, represented respectively by Dr. Emanuele D'Andria and Dr. Paolo Teofilatto, signed an agreement to collaborate in a synergic way to achieve common objectives including the development of satellites and the study of related disciplines in the space field.

And it is within this agreement that was born the collaboration for the development of the STECCO satellite, acronym for Space Travelling Egg-Controlled Catadioptric Object. The satellite aims to test an innovative attitude control device and at the same time to implement an amateur radio digipeater. The repeater will be always active simultaneously with the other functions of the satellite. STECCO will operate both in uplink and downlink at the frequency of 435.800 Mhz, 9600 baud FSK modulation, G3RUH coding, AX.25 protocol. Beacon and telemetry info are available on the project web site [1]

STECCO will be launched together with other satellites on March 22, 2021 at 6:07 am GMT from the Bajkonur cosmodrome, Kazakistan, on a Soyuz-2 rocket, in heliosynchronous orbit. Preliminary TLEs calculated on the estimated

launch parameters are available on the same project web site. [1]

The amateur radio community is also invited to share the satellite telemetry sending the data to the AMSAT Italia secretariat [segreteria] at [amsat.it].

IARU coordination info are available at
http://www.amsatuk.me.uk/iaru/formal_detail.php?serialnum=782

[1]
https://sites.google.com/uniroma1.it/stecco-sia/radio-amateurs?authuser=0

(Fabrizio IU5GEZ on behalf of AMSAT Italia)

[ANS thanks the sources listed for the above information]

Changes to AMSAT TLE Distribution for March 18, 2021

The following satellite has been added BACK to this week's AMSAT TLE Distribution:

Delfi-N3xt - NORAD Cat ID 39428.
This satellite has come back to life after seven years of silence.
(Remember AO-07 coming back after 21 years of silence?)
Thanks to AMSAT News Service Bulletin 073 (Mark Johns, K0JM) for this very good news.

The following satellite has decayed from orbit and has been removed from this week's AMSAT TLE Distribution:

Delphini - NORAD Cat ID 44030 (Decayed 3-14-2021 per Space-Track).
(I am pretty sure it won't come back!)

[ANS thanks Ray Hoad, WA5QGD, AMSAT Orbital Elements Manager, for the above information]

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Oakwood School, Morgan Hill, CA, Multi-point Telebridge via IK1SLD

The ISS callsign is presently scheduled to be OR4ISS
The downlink frequency is presently scheduled to be 145.800 MHz
The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html
The scheduled astronaut is Shannon Walker KD5DXB
Contact is go for: Mon 2021-03-22 18:27:49 UTC 66 deg

The School of Information Technology & Mathematical Sciences, Southern Hemisphere Space Studies Program 2021, Mawson Lakes, SA, Australia, telebridge via NA7V

The ISS callsign is presently scheduled to be NA1SS
The downlink frequency is presently scheduled to be 145.800 MHz
The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html
The scheduled astronaut is Shannon Walker KD5DXB
Contact is go for: Wed 2021-03-24 07:51:16 UTC 45 deg

The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at
https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors, for the above information]

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information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassador and ARRL registered instructor Clint Bradford, K6LCS, is certainly keeping busy!

He reports these upcoming satellite presentation dates …

04/01 - Orem, Utah
06/15 - East Massachusetts

… and more being scheduled.

Think a 90-minute lively, informative, and fun “How to Work the Easy Satellites” Zoom presentation would be appropriate for your convention or club? Always includes are overviews of the ARRL, AMSAT, and ARISS … and pre-presentation questions are solicited and welcome.

Send Clint an email or call!

Clint Bradford K6LCS
http://www.work-sat.com
909-999-SATS (7287)

[ANS thanks Clint Bradford, K6LCS, AMSAT Ambassador, and Paul Overn, KE0PBR, AMSAT Events Page Manager, for the above information]

Satellite Shorts From All Over

+ AMSAT congratulates long-time satellite operator John Papay, K8YSE, on 60 years of being a licensed radio amateur. He has been operating as K8YSE/60 to celebrate the milestone. (Via Bob Liddy, K8BL)

+ Some hams in Europe were able to receive Falcon 9 launch telemetry at 2232.5 MHz with a HackRF and 1.2m dish and then demodulate it with GNU Radio. Impressive work, and somewhat surprising that the data isn’t encrypted. They were able to decode live video streams from the upper stage’s engineering cameras, including one of free-floating fuel in the LOX tank, which SpaceX livestream editors tend to switch away from. (ANS thanks The Orbital Index and reddit for the above information)

+ A published paper by a pair of actual physicists at Cornell University, handily entitled “Warp drive basics,” theorizes about warp drives (as in Star Trek). Their calculations require hypothetical negative mass-energy, but at least the ship as a whole can have positive finite mass. Unfortunately, the necessary relativistic bubble would isolate the ship from the outside world, so the ship cannot create or control its own warp bubble—this would have to be done externally. Meanwhile, a second paper by another Cornell physicist, proposes a warp drive solution that avoids the negative-mass problem, but currently still requires an “astronomical amount of energy.” Who says that science fiction can't be a serious catalyst for actual research? (ANS thanks The Orbital Index for the above information)

+ A SpaceX bid on a NASA CubeSat launch appeared to offer a vehicle other than Falcon 9 or Falcon Heavy (Perhaps Starship). More details at https://spacenews.com/spacex-bid-on-launch-of-nasa-cubesat-mission/

+ The rtl-sdr.com blog features an article on receiving the SMOG-P and ATL-1 nanosatellites with an rtl-sdr. Check it out at

https://www.rtl-sdr.com/receiving-smog-p-and-atl-1-nano-satellites-with-an-rtl-sdr/

+ Several new products are available on the AMSAT Zazzle store, including a set of coasters, a watch, a t-shirt featuring the AMSAT round logo, and more. Check out the new items! 25% of the purchase price goes towards Keeping Amateur Radio in Space. https://www.zazzle.com/amsat_gear

+ All issues of The AMSAT Journal dating back to 2014 are now available to AMSAT members on AMSAT's new membership portal. The 1969-2013 archive will be added at a later date. All editions of AMSAT's Symposium Proceedings are also available for members. If you're a current AMSAT member, get logged on today. If you are not yet a member, consider joining today at https://launch.amsat.org/

+ The 2020 edition of AMSAT's Getting Started with Amateur Satellites is now available on the AMSAT store. A perennial favorite, Getting Started is updated every year with the latest amateur satellite information, and is the premier primer of satellite operation. The book is presented in DRM-free PDF format, in full color, and covers all aspects of making your first contacts on a ham radio satellite. The digital download is available for $15 at https://tinyurl.com/2020GettingStarted. The print edition is $30 plus shipping and is available at https://tinyurl.com/GS2020Print

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. President's Club donations may be made at https://www.amsat.org/join-the-amsat-presidents-club/

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.

Join AMSAT today at https://launch.amsat.org/

73 and remember to help Keep Amateur Radio in Space,

This week's ANS Editor,

Paul Stoetzer, N8HM
n8hm at amsat dot org